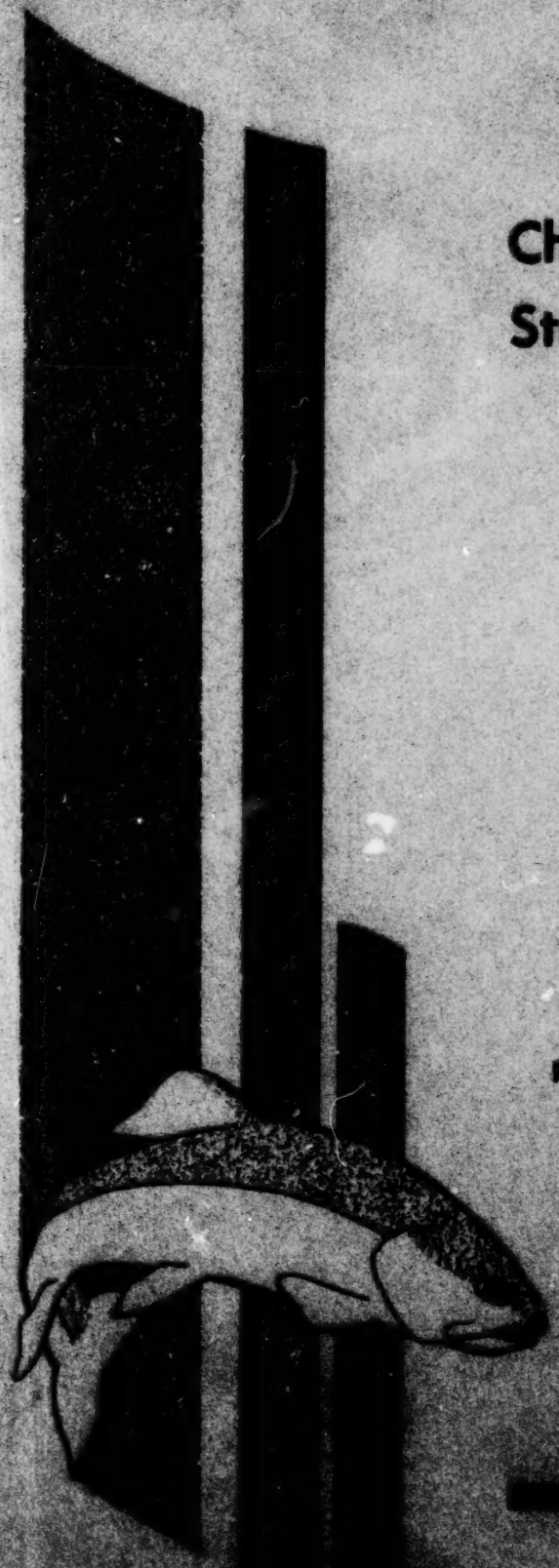

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THE 1984 CHILLIWACK-VEDDER RIVER STEELHEAD CREEL SURVEY

by

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Bibliography: p.
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1. Steelhead fishing - British Columbia - Chilliwack River - Statistics. 2. Steelhead fishing - British Columbia - Vedder River - Statistics. 3. Fishing surveys - British Columbia - Chilliwack River. 4. Fishing surveys - British Columbia - Vedder River. I. Facchin, A. (Angelo), 1952- II. British Columbia. Ministry of Environment and Parks. III. Title. IV. Series.

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ABSTRACT

Clark, B.J. and A.R. Facchin. The 1984 Chilliwack-Vedder River Steelhead Creel Survey. 1986. Fisheries Technical Circular No. 73, 19 p.

During a steelhead creel survey conducted from January to April 1984, 770 anglers were interviewed and 122 instantaneous counts were completed. An estimated 11,798 angler days (4.2 hours per angler day) were spent fishing for 4,960 steelhead (0.42 fish per day), 29% of which were hatchery fish. A total of 393 fish were killed, representing 8% of the total catch.

The 1984 creel survey was compared to the 1983/84 Steelhead Harvest Analysis questionnaire which sampled a slightly different time period. The questionnaire estimate of effort was 30% greater than the creel survey estimate. That difference is consistent with comparisons between the questionnaire and other creel surveys. However, the questionnaire estimate of total kill was 55% greater than the creel census estimate representing a much greater than average difference. The average difference between the questionnaire estimates and estimates from the 1984 and 1985 creel censuses indicate that the questionnaire overestimates effort by 36% and total kill by 48% on the Chilliwack-Vedder River.

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INTRODUCTION

The Chilliwack-Vedder River system, located 90 km east of Vancouver, British Columbia (Fig. 1) supports the Lower Mainland Region's most popular winter steelhead fishery. It accounts for over 30 percent of the total regional angler effort and catch (Steelhead Harvest Analysis 1967 to 1984).

During the 1970's the Chilliwack-Vedder fishery experienced dramatic decreases in catch and subsequent reductions in angler effort (Appendix 1a and 1b). In response to the apparent decline in the numbers of steelhead, a mandatory steelhead release was instituted in the 1978/79 season followed by a bait ban in the 1979/80 season (Appendix 3). In 1978, a hatchery program was initiated with the release of 13,643 steelhead smolts and 7,000 steelhead fry into tributaries of the Chilliwack-Vedder. Stocking, funded by the Salmon Enhancement Program, has increased annually to 120,388 smolts and 118,900 fry in 1984 (Appendix 2). Initially, the fish were cultured at Fraser Valley Trout Hatchery at Abbotsford (Research Section) but after 1981 they were produced at Chilliwack River Hatchery, located 31 km up the Chilliwack River.

In response to the return of hatchery adults, in the winter and spring of 1979/80, the bait ban was removed during the season. Also, a wild steelhead release regulation was instituted, which allowed the harvest of hatchery fish. The regulation has evolved to a wild steelhead release, single barbless hook restriction in 1984/85.

Until 1984, the only continuing source of fisheries statistics on the Chilliwack-Vedder steelhead fishery has been the annual Steelhead Harvest Analysis Reports, except for a creel survey conducted in 1972/73 (Usher 1973). The Steelhead Harvest Analysis questionnaire estimates effort and catch from a mail out questionnaire of a random sample of persons who purchased a steelhead license. Comparisons between the questionnaire and creel censuses of major steelhead rivers suggest that the questionnaire generally overestimates effort and catch (Steelhead Harvest Analysis 1978-79). Therefore, a creel survey of the Chilliwack-Vedder steelhead fishery was conducted in the spring of 1984 and repeated during the 1984/85 season in order to examine the accuracy of the questionnaire results for the Chilliwack-Vedder. This report presents the results of the 1984 creel census and compares it to a subsequent 1984/85 creel survey. Both creel censuses are compared to the corresponding Steelhead Harvest Analysis.

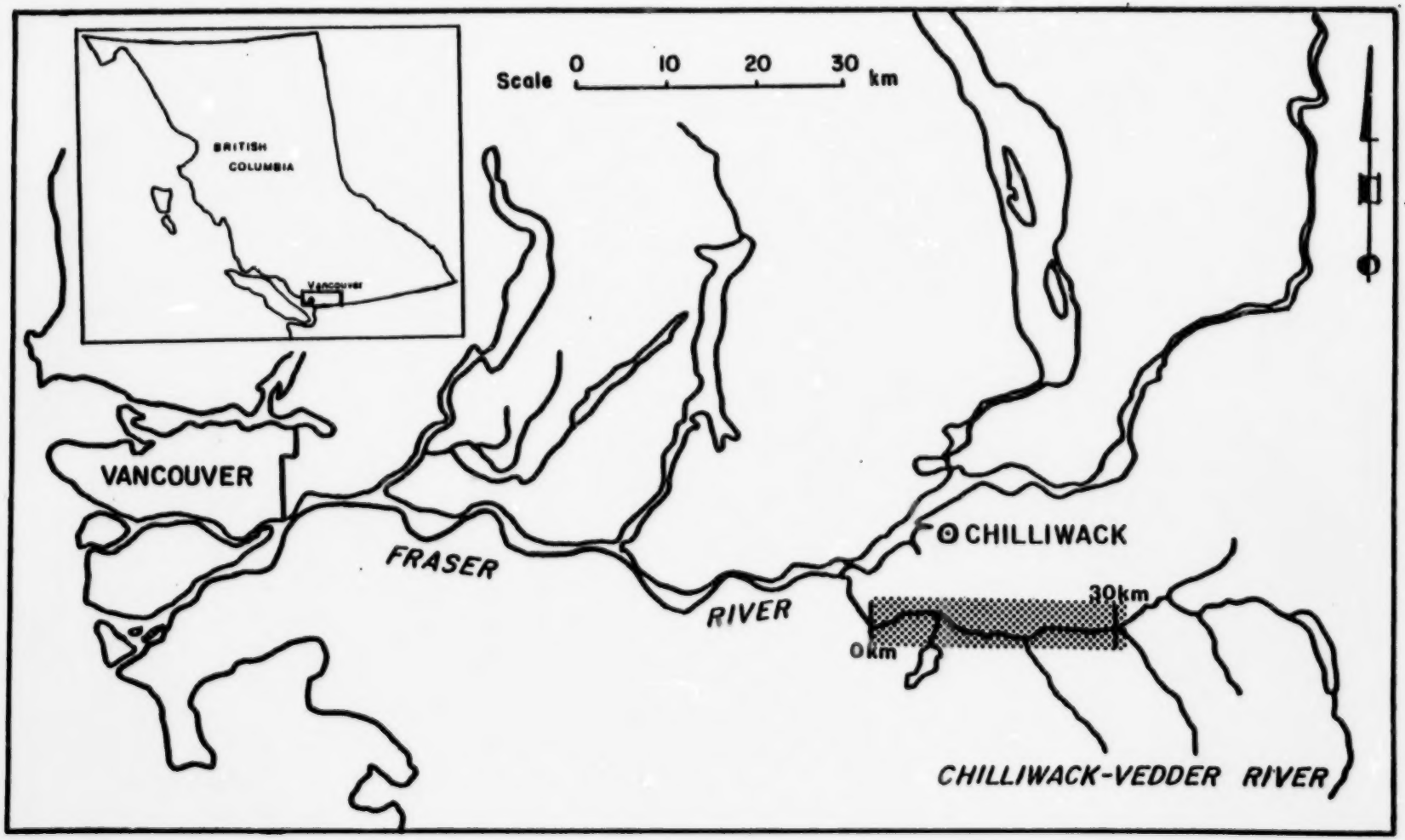

Figure 1. Location of the Chilliwack-Vedder River system in relation to Vancouver, B.C., the study area is shaded.

METHODS

A stratified random sampling design was utilized for the creel census on the Chilliwack Vedder River (Mendenhall, Ott, and Scheaffer, 1971). Five strata were selected; reach, season, river condition, type of day and time of day. The survey began on January 7, 1984 and ended on April 23, 1984.

The river was divided into reaches by determining the area of river one census taker could cover in one hour during an instantaneous count. It was assumed that angler distribution remained static over these one-hour periods. The 3 reaches were:

Reach 1 - The upper end of the Vedder Canal near Yarrow upstream to the Vedder Crossing Bridge.

Reach 2 - The Vedder Crossing Bridge upstream to the bridge crossing the mainstream immediately upstream of Tamahi Creek.

Reach 3 - The mainstream bridge crossing immediately upstream of Tamahi Creek upstream to the Slesse Creek-Chilliwack River confluence.

The sampling period was divided into seasons consisting of:

Winter - January and February, with an 8-hour fishing day.

Spring - March and April, with an 11-hour fishing day.

Days were classified into type of day consisting of:

Weekdays - Monday to Friday.

Holidays - Saturday, Sunday and holidays.

Days were divided into time of day for instantaneous counts but not for interviews. The strata consisted of:

Mornings - Before 1200 hours.

Afternoons - After 1200 hours.

River condition was recorded as:

In - When the river was low enough to be fishable.

Out - When the river was too high and muddy to be fishable.

A tally of river conditions for each reach was recorded on a daily basis by the staff of the Chilliwack River Hatchery (Department of Fisheries and Oceans).

A ten-hour census day, including travel time, was selected and angler interviews were conducted on one reach per day. Anglers were asked how long they had fished, how much longer they intended to fish, how many wild and hatchery fish they had killed or released, how many anglers were in their vehicle and where they caught their fish. Location of catch was recorded by the distance upstream in kilometers from the upstream end of the Vedder Canal (0 km, Fig. 1).

Instantaneous counts were made on reaches 1 and 3 on days when anglers in either of those reaches were interviewed. During reach 2 interview days, only that reach was counted owing to its complexity. The exact time that counts were conducted in the morning and afternoon periods was randomly selected using a 2:1 probability weighting that favored early morning and late afternoon. Angler counts were recorded by visual sightings of anglers in reach 1 and by vehicle counts in reaches 2 and 3. The total number of vehicles per count multiplied by the mean number of anglers per vehicle was used to estimate the total number of anglers per count in reaches 2 and 3.

Instantaneous counts and interviews were recorded on a single field form and later transcribed onto computer coding sheets. The information was entered into a microcomputer (DEC PRO 350). A database manager (NPL[1]) was used to edit the raw data, convert the data into useable values and summarize it by strata. A statistical package (PRO/SPSS[2]) was used to examine the effects of the strata on angler counts and calculate means of various parameters. A spreadsheet (Supercomp Twenty[3]) was used to calculate effort, catch per unit effort and catch.

Effort and catch for each strata were calculated using the following method. The number of hours available to angle equaled the number of time periods multiplied by the number of hours per time period. Hours angled (effort) equaled the mean number of anglers per hour multiplied by the number of hours available to angle. The catch per hour (CPUE) equaled the sum of the fish caught by interviewed anglers divided by the sum of the hours fished by those anglers. The total catch equaled the hours fished (effort) multiplied by the catch per hour (CPUE).

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[1]Desktop Software Corporation, Princeton, N.J., U.S.A.
[2]SPSS Inc., Chicago, ILL., U.S.A.
[3]Access Technology, Inc., South Natick, MA., U.S.A.

RESULTS

Fishery Statistics in 1984

An analysis of variance using the number of anglers in each vehicle as the dependent variable, and reach and type of day as factors, indicated there were, on average, more anglers per vehicle up the river in reach 3 than in reach 2 and there were, on average, more anglers per vehicle on holidays than weekdays ($p < .05$) (Table 1). Mean anglers per vehicle, separated into reach and type of day, were used to estimate the number of anglers per instantaneous vehicle count in reaches 2 and 3 (Table 2).

Table 1. Mean creel statistics for several of the variables sampled during the Chilliwack-Vedder creel census during 1984.

Strata	Strata Level	Anglers per count	Anglers per vehicle	Length of an angler day	Catch (fish/hr) Total	Wild	Hatchery
Strata combined		17.0	1.63	4.2	0.096	0.070	0.026
Reaches	1 (lower)	14.2	1.46	4.1	0.115	0.084	0.031
	2 (middle)	23.5	1.62	3.7	0.091	0.062	0.030
	3 (upper)	16.2	1.83	5.1	0.082	0.065	0.017
Seasons	Winter	17.5	1.65	3.8	0.075	0.055	0.020
	Spring	16.4	1.60	4.8	0.121	0.087	0.034
Type of day	Weekday	9.3	1.52	4.0	0.123	0.090	0.033
	Holiday	26.0	1.71	4.3	0.076	0.055	0.021
Time of day	Mornings	19.3					
	Afternoons	14.5					
River condition	In	19.0	1.62	4.3	0.099	0.072	0.027
	Out	6.2	1.71	2.4	0.0	0.0	0.0

Table 2. Mean number of anglers per vehicle by reach and type of day.

Reach	Type of Day Weekday	Holiday
2	1.43	1.75
3	1.68	2.00

A total of 122 instantaneous counts were completed over the four month period (Table 3). An analysis of variance using number of anglers as the dependent variable, and reach, season, type of day and time of day as factors, indicated that reach, type of day and time of day were significant factors ($p < 0.05$). On average, reach 2 had more anglers (35%) than reaches 1 or 3, which were fairly similar (Table 1). The mean number of anglers per count on holidays was much higher (64%) than on weekdays (Table 1). Over the sampling period there tended to be more anglers per count in the mornings than in the afternoons. However, the distinction between the two periods is not clear since the heaviest angling activity occurred between 1000 hr. and 1300 hr., overlapping the two time periods.

Table 3. Summary of instantaneous counts at the Chilliwack-Vedder River during 1984.

Reach	Season[1]	Type of Day[2]	Time of Day[3]	no. of Obser-vations	Mean no. of Anglers	no. of Time Periods	Hours per Period	Angler Hours
1	W	W	M	6	4.5	42	4	756.0
			A	6	5.667	42	4	952.1
		H	M	6	9.333	18	4	672.0
			A	5	5.6	18	4	403.2
	S	W	M	8	14.0	42	5	2940.0
			A	7	13.571	42	6	3419.9
		H	M	5	34.6	19	5	3287.0
			A	5	31.4	19	6	3579.6
2	W	W	M	3	20.367	42	4	3421.7
			A	3	11.367	42	4	1909.7
		H	M	4	53.375	18	4	3843.0
			A	4	38.05	18	4	2739.6
	S	W	M	3	5.68	42	5	1192.8
			A	3	3.787	42	6	954.3
		H	M	3	22.749	19	5	2161.2
			A	3	17.5	19	6	1995.0
3	W	W	M	6	14.2	42	4	2385.6
			A	6	7.5	42	4	1260.0
		H	M	6	31.7	18	4	2282.4
			A	5	25.088	18	4	1806.3
	S	W	M	8	7.932	42	5	1665.7
			A	7	4.056	42	6	1022.1
		H	M	5	30.184	19	5	2867.5
			A	5	18.032	19	6	2055.6
Total				122				49572.3
							95% confidence limits	± 5389.8

[1]Season: W = winter, S = spring
[2]Type of day: W = weekday, H = holiday
[3]Time of day: M = morning, A = afternoon

The analysis of variance indicated that season was not a significant factor ($p < 0.05$), however, reach and season had significant interaction effects, as did reach and type of day. Winter anglers concentrated in reach 2 (winter, 32.9 anglers per count, spring, 12.4 anglers per count) progressing downstream to reach 1 in the spring (winter, 6.3 anglers per count; spring, 21.5 anglers per count). There was no observed seasonal change in anglers per count in reach 3. On holidays a greater proportion of anglers (76%) travelled up river to reaches 2 and 3 than on weekdays (65%).

Effort was much higher (67%) on fishable days ("in") than on freshet days ("out") (Table 1). However, insufficient freshet days were censused to allow for statistical analysis of the instantaneous counts using all of the strata, therefore, water condition was not considered in the analysis.

A total of 770 interviews was conducted during the creel period (Table 4). The catch per unit effort (CPUE) for steelhead in total was higher in reach 1 than in reaches 2 or 3 and angling success was better in the spring than in the winter (Table 1). Weekday anglers had better success than holiday anglers, but this may be related to the increased angling activity on holidays. CPUE on fishable days ("in") was 0.1 fish per hour, while on freshet days ("out") no fish were reported amongst the 47 anglers interviewed.

The mean length of an angler day was determined from 110 anglers who indicated that they had completed fishing for the day and was estimated to be 4.2 hours (Table 1). An analysis of variance using hours fished as the dependent variable with reach and season as factors indicated that there were significant differences in hours fished between reaches and seasons ($p < .05$) (Table 5). Anglers in the upper river (reach 3) tended to fish longer than anglers lower on the river in reaches 1 or 2 (Tables 1 and 5). Anglers tended to fish longer during the better weather and longer days of the spring months than during the winter months. The mean hours per angler day, separated into reaches and seasons, were used to divide into effort (hrs) to derive effort in angler days (Table 5).

An average angler day during freshet conditions ("out") was much shorter (44%) than on fishable days. Type of day had no apparent effect on the length of an angler day (Table 1).

Table 4. Summary of the creel statistics from angler interviews for the Chilliwack-Vedder River during 1984.

Reach	Season[1]	Type of Day[2]	No.of Anglers	Hours Fished	Wild K[3]	Wild R[4]	Hatchery K[3]	Hatchery R[4]	Total K[3]	Total R[4]	Catch
1	W	W	38	142.3	0	15	0	3	0	18	18
		H	38	83.6	0	1	0	0	0	1	1
	S	W	60	195.5	0	16	2	10	2	26	28
		H	105	412.5	1	37	1	10	2	47	49
2	W	W	75	257.1	0	20	4	6	4	26	30
		H	129	405.9	0	12	5	5	5	17	22
	S	W	32	89.3	0	17	0	4	0	21	21
		H	53	155.8	0	7	0	3	0	10	10
3	W	W	73	225.1	0	13	1	0	1	13	14
		H	67	264.0	0	15	2	1	2	16	18
	S	W	51	182.6	0	17	1	5	1	22	23
		H	49	146.1	0	8	2	2	2	10	12
Total			770	2559.8	1	178	18	49	19	227	246

[1]Season: W = winter, S = spring
[2]Type of day: W = weekday, H = holiday
[3]Killed
[4]Released

Table 5. Mean length of an angler day (hours) by reach and season.

Reach	Season	
	Winter	Spring
1	2.5	4.8
2	3.6	3.8
3	4.9	5.5

Instantaneous count and interview information were combined to give the number of fish caught and angler days for each strata. An estimated 4,960 steelhead were caught by anglers who spent 11,798 days on the Chilliwack-Vedder River during the 1984 creel period (Table 6). Hatchery fish comprised 29% of the total catch and 74% of those fish were released. One percent of the wild catch was illegally killed (reported) and only 8% of the total catch was killed. Catch per angler day was 0.42, resulting from the high wild catch rate of 0.3 fish per angler day. Hatchery success was 0.12 fish per angler day with 0.03 hatchery steelhead killed per angler day.

Table 6. Summary of steelhead caught and angler days by strata for the Chilliwack-Vedder River system for 1984.

Reach	Season[1]	Type of Day[2]	Time of Day[3]	Steelhead Wild K[4]	Steelhead Wild R[5]	Steelhead Hatchery K[4]	Steelhead Hatchery R[5]	Total K[4]	Total R[5]	Total Catch	Angler Days
1	W	W	M	0	80	0	16	0	96	96	302
			A	0	100	0	20	0	120	120	381
		H	M	0	8	0	0	0	8	8	269
			A	0	5	0	0	0	5	5	161
	S	W	M	0	241	30	150	30	391	421	612
			A	0	280	35	175	35	455	490	712
		H	M	8	295	8	80	16	375	391	685
			A	9	321	9	87	18	408	426	746
2	W	W	M	0	266	53	80	53	346	399	950
			A	0	149	30	45	30	194	224	530
		H	M	0	114	47	47	47	161	208	1067
			A	0	81	34	34	34	115	149	761
	S	W	M	0	227	0	53	0	280	280	314
			A	0	182	0	43	0	225	225	251
		H	M	0	97	0	42	0	139	139	569
			A	0	90	0	38	0	128	128	525
3	W	W	M	0	138	11	0	11	138	149	487
			A	0	73	6	0	6	73	79	257
		H	M	0	130	17	9	17	139	156	466
			A	0	103	14	7	14	110	124	369
	S	W	M	0	155	9	46	9	201	210	303
			A	0	95	6	28	6	123	129	186
		H	M	0	157	39	39	39	196	235	521
			A	0	113	28	28	28	141	169	374
Total				17	3497	376	1066	393	4567	4960	11798

[1]Season: W = winter, S = spring
[2]Type of day: W = weekday, H = holiday
[3]Time of day: M = morning, A = afternoon
[4]Killed
[5]Released

Comparison of the 1984 Creel Census and the Steelhead Harvest Analysis

Angling effort from the Steelhead Harvest Analysis questionnaire was 30% greater than the creel census estimate (Table 7). This is consistent with comparisons between the questionnaire and creel survey effort estimates summarized in the Steelhead Harvest Analysis for 1978-79. Using streams with an angling effort of over 400 angler days, the questionnaire effort estimates were on average 36% greater than the corresponding creel censuses. Estimates of effort from the questionnaire ranged from 68% greater than to 11% less than corresponding creel surveys (n=30).

Table 7. Comparison of the 1984 Chilliwack-Vedder creel census and the 1983/84 Steelhead Harvest questionnaire.

		1984 Creel	1983/84 question-naire	% Difference between the questionnaire and Creel
Total angler days		11798	16799	30%
Wild	kills	17	114	85
	release	3497	7546	54
	catch	3514	7660	55
Hatchery	kills	376	769	51
	release	1066	1257	15
	catch	1442	2026	29
Total	kills	393	880	55
	release	4567	8801	48
	catch	4960	9681	49
Kills/angler day		0.033	0.053	38
Catch/angler day		0.42	0.576	27

While both techniques estimate a very high release rate for wild fish (99%), they differ in estimating the release of hatchery fish. The creel estimated a 74% hatchery release rate while the questionnaire estimated 62%.

The total kill estimated by the questionnaire was 55% higher than the creel census estimate. Estimates of killed fish should be more reliable than estimates of released fish, since it is more difficult to remember the exact number of released fish. Comparisons between the two data collection methods may be complicated by the ban on wild steelhead kills. An angler would not want to be censused when in possession of a wild steelhead, but might admit killing a wild steelhead on the questionnaire or record it as a hatchery fish. The data assembled in the Steelhead Harvest Analysis Report for 1978-79 suggests that on average the questionnaire estimates of fish killed were 32% greater than corresponding creel censuses. Questionnaire estimates range (n=30) from 63% to 2% greater than corresponding creel census estimates of fish killed. The Chilliwack-Vedder estimates of fish killed for the 1984 season are near the high end of that range.

DISCUSSION

The 1984 creel census started on January 7, 1984 and ended on April 23, 1984, however the steelhead season begins in December and ends in April. The first week of the winter season and the last week of the spring season were not sampled but assumed to be similar to the other weeks of the seasons and included in the calculations of estimated effort, releases and kills. December 1983 was not sampled and not included in the analysis. The 1985 creel census estimated that December 1984 accounted for 10% of the effort, 6% of the total catch and 24% of the total kill for the 84-85 season (Scott and Lewynsky 1985). The 1984 creel probably missed about 10% of the effort, less than 10% of the catch and may have missed a substantial portion of the kill.

The Steelhead Harvest Analysis has been estimating total angler effort and steelhead killed since the 1966/67 season and steelhead released and total catch since the 1970/71 season. Estimated effort was reduced by 36%, total kill was reduced by 32% and total released was reduced by 32% (assuming the same response bias as for total kill) for comparison to the 1984 creel results. Effort estimated by the 1984 creel census was about half of the historical maximum (69-70) but three times the minimum (78 79). Effort has been increasing since the 80-81 season (Appendix 1a). Total steelhead killed in 1984 was about 8% of the historical maximum (66-67). Total kill has declined steadily since the 66-67 season to a low in the 79-80 season and has been increasing slowly since then (Appendix 1b). Total steelhead released in 1984 was one and a half times the previous maximum (82-83) and has been increasing dramatically since the 79-80 season (Appendix 1b).

Scott and Lewynsky (1985) compared the 1984 creel census to the January 1 to April 30, 1985 results from the 1985 creel census. They noted that estimated total angler days were 50% greater in 1985 than in 1984 and that both the wild and hatchery catches for 1985 were double the 1984 catches. A greater proportion of the hatchery catch was killed in 1985 than in 1984.

The 1985 creel census (December 1, 1984 to April 30, 1985) was compared to the 1984/85 Steelhead Harvest Analysis questionnaire (Table 8). The most noticeable difference between the 1984 results (Table 7) and the 1985 results (Table 8) is in the estimates of numbers of hatchery fish released. In 1984 the questionnaire and creel differed by 15% and in 1985 they differed by 70%.

Table 8. Comparison of the 1985 Chilliwack-Vedder creel census (Scott and Lewynsky) and the 1984/85 Steelhead Harvest questionnaire.

		1985 Creel	1984/85 Questionnaire	% Difference between the Questionnaire and creel
Total angler days		19,748	33,816	42
Wild	kills	0	52	
	release	8,184	18,470	56
	catch	8,184	18,522	56
Hatchery	kills	1,434	2,354	39
	release	1,693	5,721	70
	catch	3,127	8,075	61
Total	kills	1,434	2,402	40
	release	9,877	24,188	59
	catch	11,311	26,590	58
Kills/angler day		0.073	0.071	-3
Catch/angler day		0.573	0.785	27
Hatchery component of catch		28%	30%	2

The questionnaire samples April of the previous fishing season and not April of the current fishing season. Creel census data from the Chilliwack-Vedder for April 1984 and December 1984 to March 1985 (same sampling period as the 1984/85 questionnaire) estimated effort at 19,480 angler days. That is only a 1% difference from the 1985 season total (December 1984 to April 1985) of 19,748 angler days. Effort in April accounted for only 8% of the total effort averaged over the two years and differed by 19% (268 angler days) between the two years. The different time period should not confound the comparisons, because fishing pressure in April was relatively light.

Questionnaire estimates of effort for the Chilliwack-Vedder when compared to the creel census results, are consistent with comparisons between the questionnaire and corresponding creel censuses on other streams (mean of 1984 and 1985, 36% higher). However, the difference between the questionnaire and creel census estimates of total kill are higher than the average observed differences on other streams (mean of 1984 and 1985, 48% higher).

REFERENCES

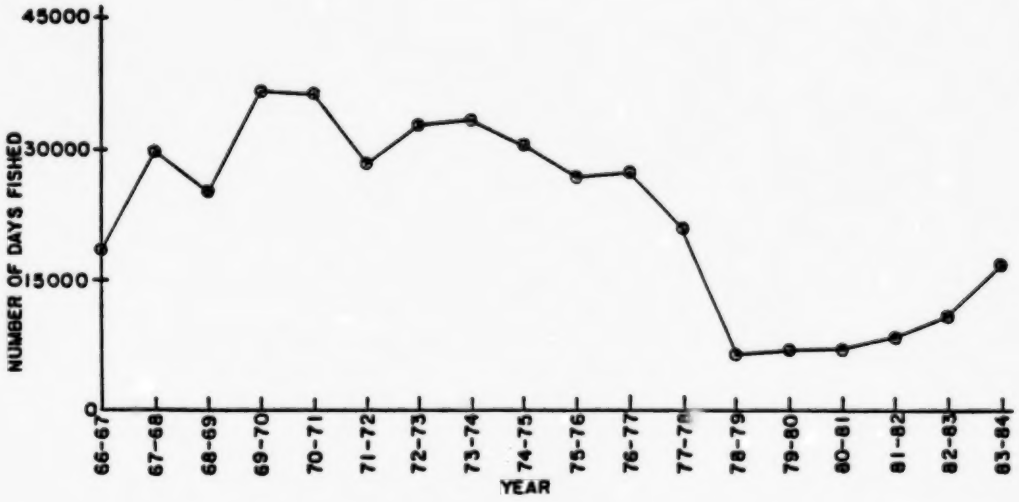
Mendenhall, W., l. Ott and R.L. Scheaffer, 1971. Elementary Survey Sampling. Wadsworth Publishing Company, Inc., Belmont, California.

Scott, K. J. and V. A. Lewynsky, 1985. Angler use and catch survey of the Chilliwack-Vedder River steelhead fishery, 1985. M.S. Prepared for B.C. Ministry of Environment and Department of Fisheries and Oceans (SEP) by H. Paish and Associates, Ltd.

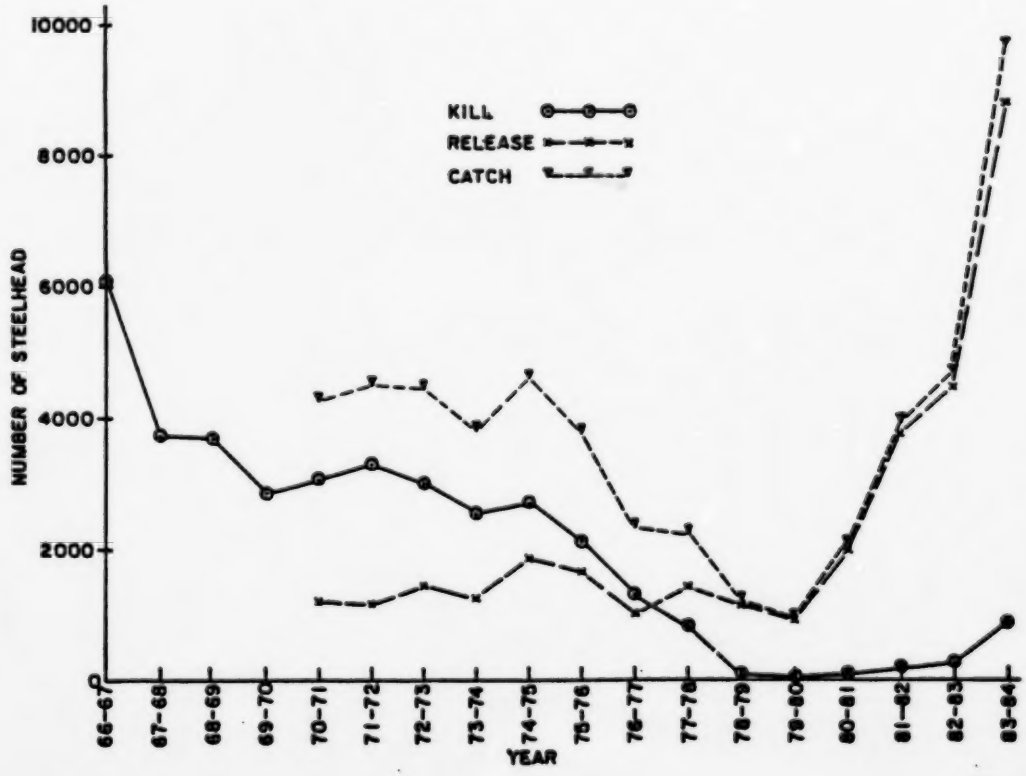
Steelhead Harvest Analysis Reports (1967 to 1985). Fisheries Branch, Ministry of Environment, Victoria, B.C.

Usher, J.B. 1973. Angler Survey, Vedder-Chilliwack River 1972-73. Fish and Wildlife Branch, 13-B Mill Street, Chilliwack, B.C. 26 p.

Appendix 1a. Steelhead Harvest Analysis angler effort estimates for the Chilliwack-Vedder River from the 1966/67 season to the 1983/84 season.



Appendix 1b. Steelhead harvest Analysis catch estimates for the Chilliwack-Vedder River from the 1966/67 season to the 1983/84 season.



Appendix 2. Winter run Steelhead introductions to the Chilliwack-Vedder River system between 1978 and 1984.

Year	Hatchery	Stock Origin	Brood Year	#/Age	Release Location	Release Date	Comments
1978	Net Pens	Native	1977	4,774/smolt	Slesse C.	April 15	
	FVIH	Native	1977	8,899/smolt	Salween C., Foley C.	April	
				13,673 Total Smolts			
	FVIH	Native	1978	7,000/fry	Liumchen C.	September	
1979	FVIH/Pens	Native	1978	13,087/smolt	Slesse C.	April 9-13	Ad., Right Max.
				9,132/smolt	Foley C.		Ad., Left Max.
				7,802/smolt	Salwein C.		Ad.
				30,021 Total Smolts			
	FVIH	Native	1979	40,000/fry	Liumchen, 10,000 Tamahi, 30,000	April 9-13	Fed Fry 15,000 fed, 15,000 unfed
	FVIH	Native	1979	6,462/fry	Post Creek	September 29	9.9 g.; Ad., R. Pelvic, R. Max.
				46,462 Total Fry			
1980	FVIH	Native	1979	9,467/smolt	Foley C.	April 3	49 g; Ad., R. Pelvic
				9,300/smolt	Salwein C.	April 3	53.3 g; Ad., L. Pelvic
				10,030/smolt	Slesse C.	April 3	53.1 g; Ad. Only
				28,797 Total Smolts			
1981	FVIH	Native	1980	9,900/smolt	Salwein C.	April 23	60.0 g; Ad., R. Max.
				8,855/smolt	Slesse C.	May 8	59.7 g; Ad. Only
				6,638/smolt	Foley C.	May 9	58.5 g; Ad. L. Max.
				25,393 Total Smolts			
1982	CHMK	Native	1981	16,430/smolt	Vedder Crossing	May 10-31	115.2 g; Ad. Only
				16,565/smolt	Foley C.		111.2 g; Ad. Only
				16,611/smolt	Tamahi Bridge		103.6 g; Ad. Only
				16,578/smolt	Slesse C.		100.0 g; Pelvic Clip
	FVIH	Native	1981	20,292/smolt	Salwein C.	May 11	10390; Ad. Max. 9902; Ad., R. Pelvic
				86,476 Total Smolts			
	FVIH	Native	1982	12,000/fry	Center C.	September 22	2.47 g; Surplus Stock
				700/fry	Center C.	October 13	5.4 g; Surplus Stock
				12,700 Total Fry			

Appendix 2. Continued.

Year	Hatchery	Stock Origin	Brood Year	#/Age	Release Location	Release Date	Comments
1983	CHWK	Native	1982	18,637/smolt	Ford Road	May	Ad.
				19,463/smolt	Tamahi Bridge	May	Ad.
				20,830/smolt	Tamahi-Vedder Crossing	May	Ad.
				19,697/smolt	Vedder-Crossing	May	Ad.
				19,547/smolt	Allison Canyon	May	Ad.
				15,556/smolt	CHWK Hatchery	May	Ad.
				113,730 Total Smolts			
	CHWK	Native	1983	65,478/fry	CHWK River	Aug. 12	No Mark
				8,400/fry	Foley C.	Aug. 27	No Mark
				34,084/fry	Slesse C.	September 8	No Mark
				107,962 Total Fry			
1984	CHWK	Native	1983	120,388/smolts	Chilliwack Mainstream	May	Ad.
				118,900/fry	Chilliwack Mainstream	August 15	No Mark

Appendix 3. Chilliwack-Vedder Steelhead Regulations.

Season	Regulations
66-67	Closure from lake to Slesse con., Slesse included.
72-73	Limited fishery in closed area 72/05/15 - 72/07/30.
73-74	Same.
74-75	Limited fishery in closed area 74/07/13 - 74/07/28.
75-76	Limited fishery in closed area 75/07/19 - 75/07/27.
76-77	Limited fishery in closed area 76/07/16 - 76/07/26.
77-78	Limited fishery in closed area 77207/16 - 77/07/24.
78-79	Limited fishery discontinued. NO FISHING upstream of Slesse Creek year round. D.O. Sth. catch and release 79/03/01 - 79/05/21.
79-80	Sth. closure 80/05/01 - 80/05/31. Bait ban and sth. C & R 79/12/01 - 80/03/15.
80-81	Angling closure d/s Slesse 81/04/15 - 81/05/31. Wild. sth. release 80/12/01 - 81/04/14.
81-82	Angling closure d/s Slesse 82/04/15 - 82/05/31. Wild sth. release 81/12/01 - 82/04/14.
82-83	Angling closure below Slesse 83/05/01 - 83/05/31. Single hook 82/07/01 - 82/11/30. Wild sth. release, single barbless hook 82/12/01 - 83/04/30.
83-84	Angling closure below Slesse 84/05/01 - 84/05/31. Single hook 83/07/01 - 83/11/30. Wild sth. release, single barbless hook 83/12/01 - 84/04/30.
84-85	Angling closure below Slesse 85/05/01 - 85/05/31. Single hook 84/07/01 - 84/11/30. Wild sth. release, single barbless hook 84/12/01 - 85/04/30.

Appendix 4. Chilliwack River water conditions.

	Reaches 1	2	3	
1983				
12/21-22	Out	Out	In	Slush/ice in lower reaches
23-24	Out	Out	Out	Edge ice/slush
25	Out	Out	In(barely)	Edge ice/slush
26-27	In	In	In	Marginal/ice
28	In	In	In	Fair
29-31	In	In	In	Good
1984				
01/01	In	In	In	Good
02	Out	Out	In(barely)	Overnight rain
03-12	Out	Out	Out	1 in 100 yr flood, dirty
13-16	Out	Out	In(barely)	Lots of people fishing in dirty water & getting fish
17-19	Out	Out	In	
20-21	In	In	In	
22-23	Out	Out	In	
24	Out	Out	In/am-Out/pm	
25	Out	Out	Out	
26-27	Out	Out	In(barely)	
28	Out	Out	Out	
29	Out	Out	In(barely)	
30	Out	Out	In	
31	Out	In(barely)	In	
02/01	In(barely)	In	In	
02-11	In	In	In	
12	Out/pm	Out/pm	In	
13	In	In	In	
14	In(barely)	In	In	
15-19	In	In	In	Lots of anglers
20	Out	Out	In/am-Out/pm	
21	In	In	In	Heavy rain
02/22-03/20	In	In	In	

Appendix 5. Cost of the 1984 Chilliwack-Vedder Steelhead Creel.

Field Labour Costs:

Creeler	Hourly Rate	Days Creeled	Total Hours	Cost
Person A	15.44	6	60	926.40
Person B	18.13	2	20	362.60
Person C	12.15	2	20	243.00
Person D	11.78	3	30	353.40
Person E	10.20	7	70	714.00
Person F	11.78	2	20	235.60
Person G	12.15	12*	120	1,458.00
Person H	11.48	12*	120	1,377.60
				$5,670.60

*creeled 8 days together

Transportation Costs:

- Transportation costs are based on a gas consumption rate of 20 1/100 km and a cost of $0.50/litre (Clark's vehicle)

- Kilometrage is based on 300 kilometers per day from Surrey and 200 kilometers per day from Chilliwack

Creeler	Total Kilometers	Total Litres	Cost of Transportation
Person A	1,800	360	180.00
Person B	600	120	60.00
Person C	400	80	40.00
Person D	900	180	90.00
Person E	2,100	420	210.00
Person F	600	120	60.00
Person G	1,600	320	160.00
Person H	1,600	320	160.00
Totals	9,600	1,920	$960.00

Write-Up Costs:

Data Transfer	8 hours @ 11.78	=	94.24
Computer Analysis	80 hours @ 13.63	=	1,090.40
Report Write-up	80 hours @ 12.51	=	1,001.05
Typing Costs	8 hours @ 10.40	=	83.20
TOTAL COST OF 1984 CREEL		=	$8,899.49

List of previous Fisheries Technical Circulars

1985 68 Barrett, D.T. and G.T. Halsey. Vol. 1. Fisheries Resources and Fisheries Potential of Williston and its Tributary Streams.

1985 69 Bruce, P.G. and P.J. Starr. Fisheries Resources and Fisheries Potential of Williston Reservoir and its Tributary Streams.

69A Bruce, P.G. and P.J. Starr. Photo-Documentation of Williston Lake Tributaries for the 1975 Assessment of Fisheries Resource Potential.

1986 70 Dixon, B.M. Age, Growth and Migration of White Sturgeon in the Nechako and Upper Fraser Rivers of B.C.

1986 71 Billings, S.J. Steelhead Harvest Analysis, 1984-85.

1986 72 Carswell, L.B., R.S. Hooton and V.A. Lewynsky. Campbell/Quinsam River Creel Surveys, 1975-76 to 1979-80.

List of previous Management Reports

1984 82 Martin, A.D. and J.M. Bell. Effects of a 2.5 Year Closure of the Cutthroat Fishery on the Upper St. Mary River: Management Implications of Implementing an Alternate Year Closure on East Kootenay Trout Streams.

1984 83 Parkinson, E., R.J. Behnke and W. Pollard. A morphological and electrophoretic comparison of rainbow trout (Salmo gairdneri) Above and Below Barriers on Five Streams on Vancouver Island, B.C.

1985 84 A Questionnaire Survey of Vancouver Island Steelhead Anglers' Opinions and Preferences on Management Issues.

1985 85 Big Qualicum River Steelhead Fishery Investigations, 1976 to 1981.

1986 86 Hooton, R.S. & M.G. Lirette. Telemetric Studies of Winter Steelhead, Gold River, 1982-83.

1986 87 Parkinson, E.A. Skaha Hatchery Evaluation.